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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: MADISON, Joel V.	**AMENDMENT AND RESPONSE TO OFFICE ACTION DATED 01/30/2009**
Serial No.: 10/776,555	
Filing Date: February 10, 2004	Date Transmitted: March 30, 2009
Attorney Docket No.: EIC-401	Examiner: KIM, John K.
Title: THRUST BALANCING DEVICE FOR CRYOGENIC FLUID MACHINERY	Group Art Unit: 2834

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT AND RESPONSE TO OFFICE ACTION

Dear Sir:

Applicant is in receipt of the official OFFICE ACTION mailed January 30, 2009. Thank you for your continued expedient examination of the present Application.

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STATUS OF CLAIMS

Claims 1, 3, 5, 7, 9 and 11 are pending in the application.

Claims 1, 3, 5, 7, 9 and 11 are rejected.

The action is final.

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SUMMARY OF OFFICE ACTION

DETAILED ACTION

1. The Examiner states: "This Office action is in response to papers filed on 24 March 2008. Amendments made to the claims and Applicant's remarks have been entered and considered. Claims 1, 3, 5, 7, 9 and 11 are pending and are presented for examination."

Response to Arguments

2. The Examiner states: "Applicant amended claim with new limitations and therefore arguments moot."

3. The Examiner states: "The examiner's supplementary responses to the arguments are herewith presented respectively."

4. The Examiner states: "The applicant or the representative argued as "... While the Court recently slightly eased up on the requirement for a finding of the traditional "suggestion-teaching-motivation" in obviating prior art, it clearly cannot have intended the Patent Office to completely do away with the well known doctrine that hindsight reconstructions based on the Applicants' own invention are vehemently forbidden. In re Fritch, 23 U.S.P.Q. 2d 1780, 1784 (Fed. Cir. 1992)".

The examiner believes motivation remarked in the office action would have been appreciated by those of ordinary skilled in the art. However, to satisfy the applicant better, 'suggestion or teaching and motivation to combine with rational reasoning' has been described with more detail. In broad meaning, it is clear that Fisher is teaching use of spacer between bearing and torque control means (centrifugal mechanism). The spacer is stationary and said torque control means is composure of many elements. The examiner believes the spacer can be applied to another analog mechanism for those ordinary skilled in the art keeping the same idea. The argument continues as

"... In the present case, Examiner has cited 3 prior art references all directed to electric motors, not electric generators, turbines or pumps".

The examiner respectfully disagrees. Electric motors and electric generators are analog and interchangeable. The motor of Fisher can be used for generator only by applying mechanical input to the shaft. (see reference list below) For those ordinary skilled in the art, it is well understood. It is notoriously old and well known that generator can be a turbine and pumps are operated by motor.

Applicant's remark that "(machines in) the cited prior art references are completely unrelated to cryogenic liquid handling equipment' is therefore totally un persuasive."

5. The Examiner states: "Drawing objection has been withdrawn."

6. The Examiner states: "List of references for official notice.

- Turner (US 6906490) see col. 2, line 23-36 for motor-generator interchangeable.
- Desta et al (US 2003/0122436): See Abstract for generator having the same machine configuration as that of Fisher.
- Dickinson et al (US 2007/0063608) : See [0002] for generator or motor having the same machine configuration as that of Fisher.
- Due to copyright issue, the examiner can not present copy of the book but the following scientific book is very helpful to study the theory and principle. If further and depth understanding needed, please find this book. "Miller TJE [2001] [Ed] 'Electronic Control of Switched Reluctance Machines'. Newnes Publishers, c.272pp, ISBN 0 7506 5073 7"
- For technical reference of the fact "stainless steel and thermal coefficient of fiber glass is lower than that of stainless steel", please find attached fiberglass.pdf (NPL).
- For shaft made of stainless steel, Dickinson et al (US 2007/0063608) [0060], Corengia (US 2005/01 04467) [0010] and Pop (US 2002/0047426) [0055]."

Response to Amendment

7. The Examiner states: "The claims 1,5 and 9 have been amended, and therefore, the rejections are amended accordingly. The examiner reviewed amended claims and remarks as follows."

Claim Rejections - 35 USC § 112

8. The Examiner states: "Claims 3, 7 and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims refer 'operating parameters' and 'temperature range'. However those values are not specified. Therefore, the height of the spacer selected according to desired thrust equalizing mechanism operating parameters over the temperature range is indefinite accordingly. For the purpose of examination, the examiner interprets the height of the spacer is selected operable over the temperature range of the machine."

Claim Rejections - 35 USC § 103

9. The Examiner states: "Claims 1, 3, 5, 7, 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA (Applicant Admitted Prior Art) in view of Fisher et al (US 6215214) and in further view of Agnes et al (US 6570284).

As for claim 1, AAPA shows (in Figs. 1-2) and discloses for a cryogenic liquid turbine generator or pump having main product-lubricated bearings (6) separated by a span of shaft (4) and a thrust equalizing mechanism (line 7-8, Page 4) adjacent one of said main bearings (6). AAPA however failed to show or disclose an improvement comprising (1) a stationary spacer interposed between the thrust equalizing mechanism and its adjacent main bearing to reduce the span between said main bearings, wherein (2) the spacer is composed of material that shrinks less than the shaft of

the generator.

Re (1), Fisher teaches (in Fig. 5) a stationary spacer (258) interposed between centrifugal mechanism (258) and its adjacent main bearing (216) to reduce the span (256) between said main bearings (col. 5, line 1-23). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have a stationary spacer interposed between the thrust equalizing mechanism and its adjacent main bearing to reduce the span between said main bearings by combining the teaching of Fisher with that of AAPA for preventing deflection of rotor shaft during heavy side loading. (col. 2, line 29-34)

Re (2), Agnes shows (in Fig. 7) and discloses a spacer (54) is composed of material of fiberglass. Agnes however is silent to disclose the fiber glass shrinks less than the shaft of the generator. However it is well known in the art that shaft is made of stainless steel and thermal coefficient of fiber glass is lower than that of stainless steel, and motor and generator are same machine that are exchangeable. Hence, the examiner take official notice regarding the fiber glass shrinks less than the shaft of the generator. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the spacer is composed of material that shrinks less than the shaft of the generator by combining teachings of Agnes to AAPA to incorporate a double insulation feature and thereby eliminating the need for a direct ground cable by construction of a non-conductive, electrically insulating material. (col. 3, line 32-35, col. 7, line 32-35)

As for claim 3, AAPA in view of Fisher and in further view of Agnes shows and discloses the claimed invention as applied to claim 1 above. Agnes further shows (in Fig. 7) and discloses a spacer (54) made of fiberglass, and therefore it has operating parameters over a temperature range as the maximum temperature of fiberglass (at least 1550 degree F) typically exceeds the design temperature of generator/pump (typically 180 degree C or less). Therefore, it would have

been obvious to a person of ordinary skill in the art at the time the invention was made to have the height of the spacer selected according to desired thrust equalizing mechanism operating parameters over temperature range, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPO 215 (CCPA 1980).

As for claim 5, AAPA shows (in Figs. 1-2) and discloses, for a cryogenic liquid turbine generator or pump having product-lubricated main bearings (6) separated by a span of shaft (4) and a thrust equalizing mechanism (line 7-8, Page 4) which includes a stationary thrust plate (8) adjacent one of the main bearings (6) and a variable orifice (20) defined between the thrust plate (8) and a throttle plate (10) affixed to the shaft (4).

AAPA, however, failed to teach or suggest an improvement comprising (1) a stationary length compensator interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings, (2) wherein the spacer is composed of material that shrinks less than the shaft of the generator.

Re (1), Fisher shows (in Fig. 5) and discloses a stationary length compensator (268) interposed between centrifugal mechanism (258) and its adjacent main bearing (216) to space said adjacent main bearing (6) from the centrifugal mechanism in order to reduce (col. 5, line 1-23) the span (256) between said main bearings (216, 218). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the stationary length compensator interposed between the thrust plate (8, AAPA) instead of centrifugal mechanism and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings by combining the teaching of Fisher with that of AAPA for preventing deflection of rotor shaft during heavy side loading. (col. 2, line 29-34)

Re (2), Agnes shows (in Fig. 7) and discloses a spacer (54) is composed of material of fiberglass. Agnes however is silent to disclose the fiber glass shrinks less than the shaft of the generator. However it is well known in the art that shaft is made of stainless steel and thermal coefficient of fiber glass is lower than that of stainless steel, and motor and generator are same machine that are exchangeable. Hence, the examiner take official notice regarding the fiber glass shrinks less than the shaft of the generator. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the spacer is composed of material that shrinks less than the shaft of the generator by combining teachings of Agnes to AAPA to incorporate a double insulation feature and thereby eliminating the need for a direct ground cable by construction of a non-conductive, electrically insulating material. (col. 3, line 32-35, col. 7, line 32-35)

As for claim 7, except claim dependency, the claim contains the same limitation as claim 3 and is rejected for the same reason set forth in connection with the rejection of claim 3 above.

As for claim 9, AAPA shows (in Figs. 1-2) and discloses for a cryogenic liquid turbine generator or pump having product-lubricated main bearings separated by a span of shaft and a thrust equalizing mechanism (line 7-8, Page 4) which includes a stationary thrust plate (8) adjacent one of the main bearings (6).

AAPA however failed to show or disclose an improvement comprising (1) stationary means interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings, (2) wherein the spacer is composed of material that shrinks less than the shaft of the generator.

Re (1), Fisher shows (in Fig. 5) and discloses a stationary means (268) interposed between centrifugal mechanism (258) and its adjacent main bearing (216) to space said adjacent main bearing (6) from the centrifugal mechanism in order to reduce (col. 5, line 1-23) the span (256)

between said main bearings (216, 218). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the stationary means interposed between the thrust plate (8, AAPA) instead of centrifugal mechanism and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings by combining the teaching of Fisher with that of AAPA for preventing deflection of rotor shaft during heavy side loading. (col. 2, line 29-34)

Re (2), Agnes shows (in Fig. 7) and discloses a spacer (54) is composed of material of fiberglass. Agnes however is silent to disclose the fiber glass shrinks less than the shaft of the generator. However it is well known in the art that shaft is made of stainless steel and thermal coefficient of fiber glass is lower than that of stainless steel, and motor and generator are same machine that are exchangeable. Hence, the examiner take official notice regarding the fiber glass shrinks less than the shaft of the generator. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the spacer is composed of material that shrinks less than the shaft of the generator by combining teachings of Agnes to AAPA to incorporate a double insulation feature and thereby eliminating the need for a direct ground cable by construction of a non-conductive, electrically insulating material. (col. 3, line 32-35, col. 7, line 32-35)

As for claim 11, except claim dependency, the claim contains the same limitation as claim 3 and is rejected for the same reason set forth in connection with the rejection of claim 3 above."

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DECLARATION UNDER 37 CFR 1.132

Applicant submits herein DECLARATION OF HANS E. KIMMEL, PH.D., UNDER 37 C.F.R. 1.132 in compliance with 37 CFR 1.132 to overcome claim rejections.

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